

What is claimed is:

1. A fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence of a peptide or protein that does not bind an immunoglobulin Fc region.
2. The fusion protein of claim 1, wherein the peptide or protein that does not bind an immunoglobulin Fc region is a peptide or protein of Protein A, Protein G, Protein H or Protein M.
3. The fusion protein of claim 1, comprising the amino acid sequences of two immunoglobulin binding domains of Protein L.
4. The fusion protein of claim 1, comprising the amino acid sequences of three immunoglobulin binding domains of Protein L.
5. The fusion protein of claim 1, comprising the amino acid sequences of four immunoglobulin binding domains of Protein L.
6. The fusion protein of claim 1, comprising the amino acid sequences of five immunoglobulin binding domains of Protein L.
7. The fusion protein of claims 1-6, wherein the first amino acid sequence is joined to the second amino acid sequence by a linker amino acid sequence.
8. The fusion protein of claim 7, wherein the linker amino acid sequence comprises at least three amino acids.
9. The fusion protein of claim 7, wherein the linker amino acid sequence comprises at least ten amino acids.
10. The fusion protein of claim 7, wherein the linker amino acid sequence comprises (Gly-Gly-Gly-Gly-Ser)₃.
11. The fusion protein of claim 1, wherein the second amino acid sequence is an amino acid sequence of a virus protein.
12. The fusion protein of claim 11, wherein the virus protein is an

alphavirus E2 protein.

13. The fusion protein of claim 1, wherein the second amino acid sequence is an amino acid sequence of an immunogenic peptide.

14. The fusion protein of claim 1, wherein the second amino acid sequence is an amino acid sequence of a vector comprising a nucleic acid encoding an immunogenic or therapeutic protein or peptide.

15. A composition comprising the fusion protein of claims 1-14, complexed with an immunoglobulin molecule or a Fab₂ fragment of an immunoglobulin molecule.

16. A nucleic acid encoding the fusion protein of claims 1-14.

17. A vector comprising the nucleic acid of claim 16.

18. A cell comprising the vector of claim 17.

19. A virus particle comprising the fusion protein of claim 11.

20. An alphavirus particle comprising the fusion protein of claim 12.

21. A method of making a fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence of a peptide or protein that does not bind an immunoglobulin Fc region, comprising:

a) culturing cells comprising a recombinant nucleic acid encoding a fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence of a peptide or protein that does not bind an immunoglobulin Fc region under conditions whereby the recombinant nucleic acid is expressed to produce the fusion protein; and

b) collecting the fusion protein from the cells.

22. A method of delivering the fusion protein of claims 1-14 to an Fc receptor-bearing cell of a subject, comprising administering to the subject an effective amount of the fusion protein of claims 1-14.

23. A method of delivering the fusion protein of claims 1-14 to an Fc-receptor bearing cell of a subject, comprising administering to the subject an effective amount of the composition of claim 15.

24. A method of delivering a therapeutic or immunogenic protein or peptide to an Fc-bearing receptor cell in a subject, comprising administering to the subject an effective amount of the fusion protein of claim 14 or an effective amount of the composition of claim 15.

25. A method of delivering a therapeutic or immunogenic substance to a target cell in a subject, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence of a therapeutic or immunogenic protein or peptide; and

b) an Fab₂ fragment of an antibody specific for a receptor on the surface of the target cell.

26. A method of delivering a therapeutic or immunogenic substance to a target cell in a subject, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence which is an amino acid sequence of a vector comprising a nucleic acid encoding an immunogenic or therapeutic protein or peptide; and

b) an Fab₂ fragment of an antibody specific for a receptor on the surface of the target cell.

27. A method of eliciting an immune response in a subject, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one

immunoglobulin-binding domain of Protein L and a second amino acid sequence of an immunogenic protein or peptide; and

b) an Fab₂ fragment of an immunoglobulin molecule specific for a receptor on the surface of the target cell or an immunoglobulin molecule capable of binding an Fc receptor on a cell.

28. A method of eliciting an immune response in a subject, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin-binding domain of Protein L and a second amino acid sequence which is an amino acid sequence of a vector comprising a nucleic acid encoding an immunogenic protein or peptide; and

b) an Fab₂ fragment of an immunoglobulin molecule specific for a receptor on the surface of the target cell or an immunoglobulin molecule capable of binding an Fc receptor on a cell.

29. A method of treating cancer in a subject in need thereof, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin binding domain of Protein L and a second amino acid sequence of a substance that is toxic to the cancer cell; and

b) an Fab₂ fragment of an antibody specific for a receptor on the surface of a cancer cell of the subject.

30. A method of treating cancer in a subject in need thereof, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin binding domain of Protein L and a second amino acid sequence which is an amino acid sequence of a vector comprising a nucleic acid encoding a substance that is toxic to the cancer cell; and

b) an Fab₂ fragment of an antibody specific for a receptor on the surface of a cancer cell of the subject.

31. A method of treating cancer in a subject in need thereof, comprising administering to the subject an effective amount of a composition comprising:

a) a fusion protein comprising a first amino acid sequence of at least one immunoglobulin binding domain of Protein L and a second amino acid sequence which is an amino acid sequence of an oncolytic virus; and

b) an Fab₂ fragment of an antibody specific for a receptor on the surface of a cancer cell of the subject.

32. The method of claim 31, wherein the oncolytic virus is an alphavirus.

33. A pharmaceutical composition comprising the fusion protein of any one of claims 1-14 in a pharmaceutically acceptable carrier.

34. A pharmaceutical composition comprising the composition of claim 15 in a pharmaceutically acceptable carrier.

35. A pharmaceutical composition comprising the vector of claim 17 in a pharmaceutically acceptable carrier.

36. A pharmaceutical composition comprising the virus particle of claim 19 or 20 in a pharmaceutically acceptable carrier.